Exhibit D

Third Edition

ORGANIC CHEMISTRY

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35.14 Rayon. Cellophane

When an alcohol is treated with carbon disulfide and aqueous so
droxide, there is obtained a compound called a *xanthate*.

$$RONa + S{=}C{=}S \longrightarrow RO{-}\underset{\underset{S}{\|}}{C}{-}SNa \xrightarrow{H^+} ROH + CS_2$$

A xanthate

Cellulose undergoes an analogous reaction to form *cellulose xanthate*, w
solves in the alkali to form a viscous colloidal dispersion called *viscose*.

When viscose is forced through a spinnerette into an acid bath, c
regenerated in the form of fine filaments which yield threads of the mater
as *rayon*. There are other processes for making rayon, but the viscose
still the principal one used in the United States.

If viscose is forced through a narrow slit, cellulose is regenerat
sheets which, when softened by glycerol, are used for protective films (C

Although rayon and Cellophane are often spoken of as "regener
lose," they are made up of much shorter chains than the original cellul
of degradation by the alkali treatment.

35.15 Cellulose ethers

Industrially, cellulose is alkylated by the action of alkyl chlorides (ch
sulfates) in the presence of alkali. Considerable degradation of the long
unavoidable in these reactions.

Methyl, ethyl, and benzyl ethers of cellulose are important in the p
of textiles, films, and various plastic objects.

PROBLEMS

1. (+)-*Gentiobiose*, $C_{12}H_{22}O_{11}$, is found in the roots of gentians. It is a
sugar, forms an osazone, undergoes mutarotation, and is hydrolyzed by aqueo
by emulsin to D-glucose. Methylation of (+)-gentiobiose, followed by hydrol
2,3,4,6-tetra-O-methyl-D-glucose and 2,3,4-tri-O-methyl-D-glucose. What is th
and systematic name of (+)-gentiobiose?

2. (a) (+)-*Trehalose*, $C_{12}H_{22}O_{11}$, a non-reducing sugar found in young mu
gives only D-glucose when hydrolyzed by aqueous acid or by maltase. Methyla
an octa-O-methyl derivative that, upon hydrolysis, yields only 2,3,4,6-tetra-O-
glucose. What is the structure and systematic name for (+)-trehalose?

(b) (−)-*Isotrehalose* and (+)-*neotrehalose* resemble trehalose in most respe
ever, isotrehalose is hydrolyzed by either emulsin or maltase, and neotrehalose
lyzed only by emulsin. What are the structures and systematic names for these t
hydrates?

3. *Ruberythric acid*, $C_{25}H_{26}O_{13}$, a non-reducing glycoside, is obtained fro
root. Complete hydrolysis gives *alizarin* ($C_{14}H_8O_4$), D-glucose, and D-xylos
hydrolysis gives alizarin and *primeverose*, $C_{11}H_{20}O_{10}$. Oxidation of primeve
bromine water, followed by hydrolysis, gives D-gluconic acid and D-xylose. M